

Introduction

As humans we are all hard-wired to need contact with nature (Zeisel, 2011), and our engagement with the natural world is a vital component of our health and wellbeing (Frumkin, 2001). The biophilia hypothesis, introduced by Wilson (1984), asserts that human beings are driven by an innate need to interact with nature. This is further described by Bossen (2010) as a fundamental interconnectedness between human beings and the natural world, giving rise to profound physiological, psychological, and emotional responses. Corroborated through a growing body of contemporary evidence, in practice, the hypothesis suggests that contact with the natural world can promote wellbeing (Wolsko & Lindberg, 2013), reduce anxiety (Martyn & Brymer, 2016), improve social interaction and engagement (Bragg et al., 2011; Clatworthy et al., 2013), self-esteem and mood (Barton & Pretty, 2010), and is intrinsically restorative (Kaplan, 1995).

Substantive evidence supporting the importance of the natural world in promoting health and wellbeing for the general population is well established (Clark et al., 2013; Marmot, 2010). Correspondingly, increasing recognition in national policy identifies the need to reconnect people with the natural world, and that ‘everyone should have fair access to a good quality natural environment’ (HM Government, 2011, p.44). However, in practice, people living with dementia are often denied access to the natural world (Argyle et al., 2017). Evidence suggests that fifty percent of people living with dementia in residential care never go outside (Gillard & Marshall, 2012), and fifty percent of people living independently with dementia report to leaving their homes no more than once per week (Kane & Cook, 2013). Ensuring access to the natural world for people living with dementia is not simply an act of good practice, but a fundamental human right (Argyle et al., 2017; Gillard & Marshall, 2012).

People living independently with dementia in their own homes are at risk of depression, loneliness (Lakey et al., 2012) and of becoming isolated (Aminzadeh et al., 2010; Argyle et al., 2017). Furthermore, evidence examining the impact of engagement with the natural world for people living independently is limited (Noone et al., 2017) and fragmented (Clark et al., 2013), and has largely focused on people living in residential care (Whear et al., 2014). In

view of the fact that the majority of people living with dementia in the United Kingdom reside independently in their own home (Prince et al., 2014), a need exists to analyse and synthesise existing literature examining the impact for individuals within this particular group. Further understanding of the benefits and potential barriers people living independently with dementia may experience in accessing and engaging with the natural world is required, as this has important implications, not only for individuals living with dementia and their quality of life, but also for ensuring the provision of person-centred care. Furthermore, in light of the Covid-19 pandemic and the impact to health and wellbeing, now more than ever, it is vital to enable people living with dementia to make and maintain meaningful connections with the natural world.

This review will address the following question:

‘What do people living with dementia think are the benefits of meaningful connections with the natural world when living independently with dementia, and what factors enable or challenge their engagement’

For the purpose of this review a broad definition of the following terms will be adopted.

Table 1. Definition of terms

Term	Definition
The natural world	parks, woodlands, forests, lakes, open countryside, and coastal and wilderness areas, together with the associated multi-sensory connections to the weather, plants, trees, and animals within these areas
Meaningful connections	active and passive engagement in the natural world that holds meaning for the individual, for example, sitting in the park listening to bird song, walking in the countryside, or taking part in a group-based outdoor activity such as a walking or gardening group

Living independently	living in a home setting, not in an institution, either on their own or with an informal carer, such as a spouse or relative
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Methods

Search terms

A comprehensive search was completed in February 2021, using six electronic databases: PsycINFO, CINAHL, Greenfile EBSCO, MEDLINE, SCOPUS, and OVID. Databases were chosen in order to find studies from a range of disciplines relevant to dementia research.

Search terms were developed from existing literature reviews and in consultation with library services, used together with Boolean operators 'AND' and 'OR', and truncations (e.g. natur*) where appropriate, to capture a greater depth of evidence. Table 2 gives a summary of the search terms.

Table 2. Summary of search terms.

Search	Terms
1	Dementia AND
2 – terms selected to represent the natural world:	Outdoors OR green space OR green exercise OR woods OR nature OR gardening OR forest OR lakes OR walking OR natural environment AND
3 – terms selected to access a range of possible effects:	Wellbeing OR quality of life OR benefits OR barriers OR impact OR outcomes

Additional studies were sourced through manual internet searches, together with information and evaluation reports requested via email to four relevant organisations: Natural England, The Sensory Trust, Dementia Adventure, Forest of Avon Trust and author Dr Grant Gibson, Stirling University.

Inclusion criteria

Inclusion criteria considered:

- all types of dementia, throughout the trajectory – to offer inclusivity as initial searches showed papers often did not report subtypes
- both ‘passive’ (observational) and ‘active’ (physically taking part in) engagement with the natural world occurring in any outdoor setting, either independently, with another person or within a group
- ‘grey literature’, for presenting a balanced picture of available evidence and preventing bias (Paez, 2017)
- literature from all countries published between 2000 and 2021 to allow for a broad range of contemporary evidence and to ensure relevance to the broader contemporary discourse, theories and practice
- qualitative research methods which focused on the subjective experience of people living with dementia using first-person narrative accounts, with the inclusion of mixed methods papers where qualitative data could be extracted separately
- research focused on people living independently. However, where multiple residential setting participants were used, data analysis and findings required separate evaluation

Exclusion criteria

Studies and literature were not included if they:

- were published in a language other than English, for author interpretation
- were reviews of the literature, as opposed to empirical data (which removed the possibility of duplicate evidence or studies not including first person narratives)
- did not solely focus on dementia
- were study protocols

Results

The initial electronic database search identified 8651 citations, rising to 9275 with the inclusion of additional searches and evaluation reports. Duplicates were removed, reducing to 6173 studies. A three-stage selection approach resulted in twelve eligible studies. In

addition, four studies were identified through the manual search of included study reference lists, culminating in sixteen studies. The selection process is outlined in figure 1.

Study characteristics

Overall, of the sixteen studies included in this review, nine were conducted in the UK, two in the Netherlands, two in Sweden, two in Canada and one in Norway. Thirteen studies used a qualitative methodological approach and three used a mixed methods approach (Mapes et al., 2016; Mapes & Hide, 2011; Sensory Trust, 2018). All studies used interviews as a data collection method, two of which were group based (Noone & Jenkins, 2018; Sensory Trust, 2018), while four also incorporated observations (Cook, 2020; Gibson, Ramsden, Tomlinson et al., 2017; Noone & Jenkins, 2018; Sensory Trust, 2018).

The number of participants within the studies varied, with seven of the qualitative studies incorporating a small-scale sample size of less than twelve participants, whereas others used up to ninety-four participants. Nine studies reported the age range of participants, ranging from the youngest at 50 years (Mapes et al., 2016), to the oldest at 96 years (Ibsen et al., 2019). Five of the studies included participants in the early or early to mid-stages of dementia (Duggan et al., 2008; Ibsen et al., 2019; McDuff & Phinney, 2015; Olsson et al., 2013; Smith Carrier et al., 2019), and a further two from early to late-stage dementia (Gibson et al., 2007; Mapes et al., 2016). The remaining nine studies did not specify, although one study acknowledged that no formal measure of 'severity' was taken (Gibson, Ramsden, Tomlinson et al., 2017).

An overview of study characteristics is presented in table 3.

Selected studies were analysed using the process of thematic analysis as detailed by Braun & Clarke (2006), to enable identification, analysis and reporting of common themes present across the selected literature. Data in the form of quotations and author interpretations were extracted. The articles and extracted data were read and re-read and the findings organised into themes.

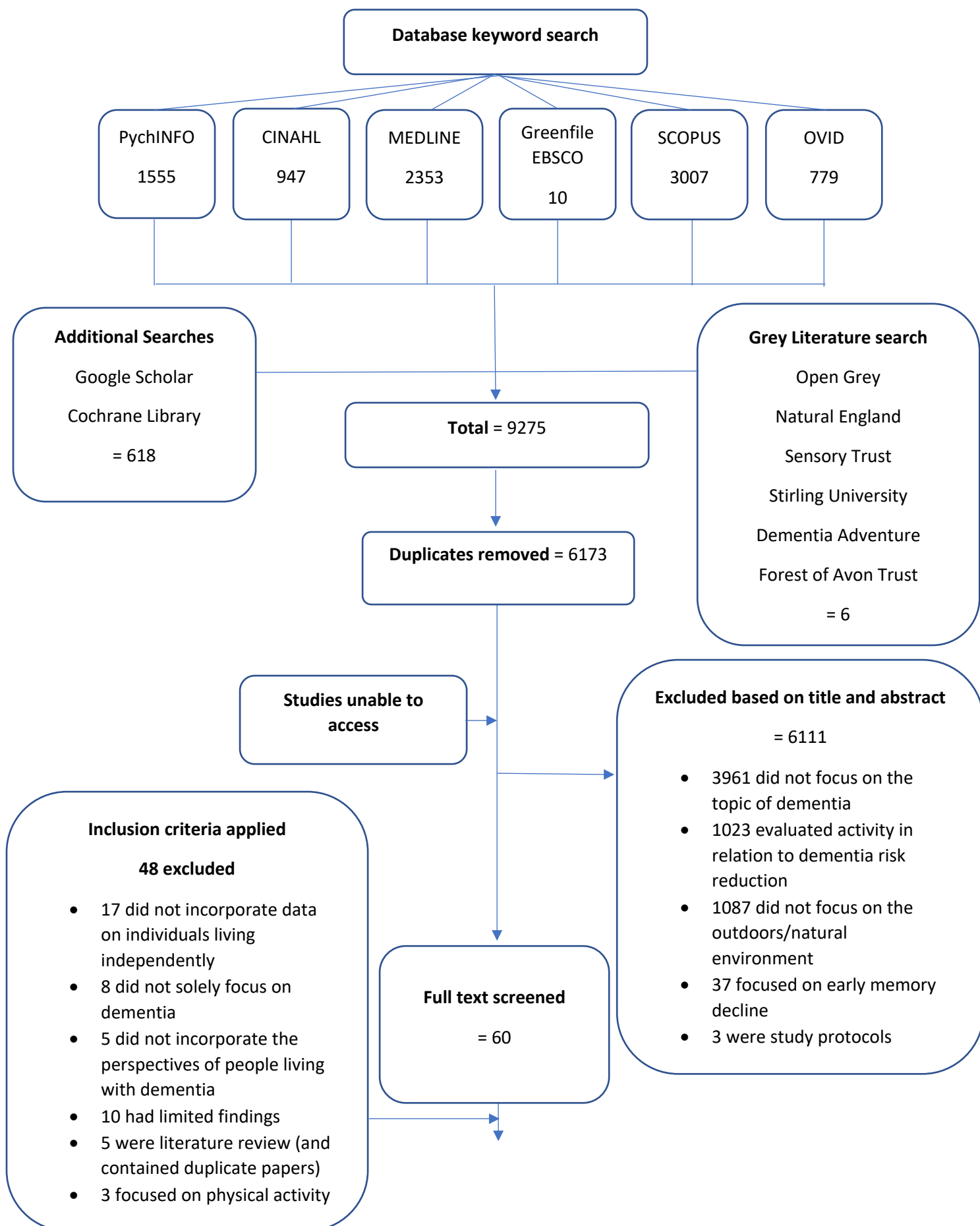
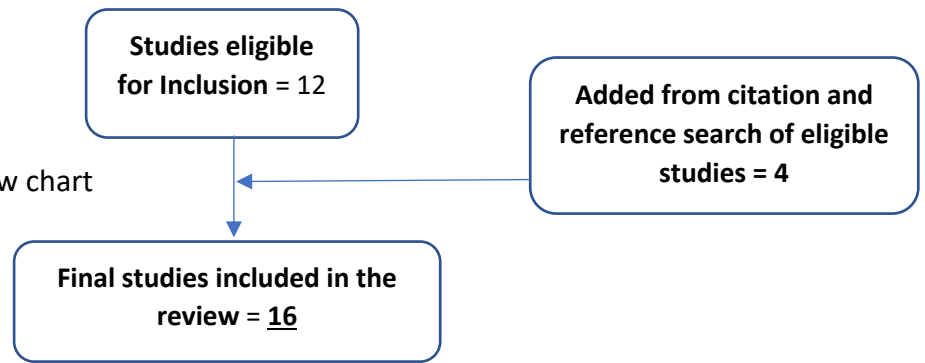


Figure 1. Study selection Flow chart



Author, Publication Year and Geographical Location	Aim	Method	Participants and Age Range	Setting	Main Identified themes
Cook, 2020 UK	How the meaning and use of urban woodlands and forests contribute to positive wellbeing of people living with dementia	Qualitative Semi-structured interviews Walk-along interviews Observations Photovoice	5 people with dementia- all male Carers (dementia exclusive group) Age 52-83	Woodland Activity	Supporting valued activities Encouraging social interaction Connection to nature Enhanced feeling of mental wellbeing Increased sense of empowerment and control
De Bruin et al.,2021 Netherlands	Assess the value of urban nature-based day care centres for people with dementia and their carers	Qualitative Semi-Structured interviews	21 people with dementia (13 male and 8 female) and 18 carers (dementia exclusive group) Age 51-90	Farm based day care	Contact with nature and animals Activity engagement Structure Social interactions Meaningfulness Focus on normal daily life

<p>Duggan et al., 2008 UK</p>	<p>To explore how people with dementia use and experience the outdoor environment</p>	<p>Qualitative Semi-structured interviews</p>	<p>22 people with dementia and 14 carers Mild to moderate dementia Age 71-84</p>	<p>Independent outdoor activity</p>	<p>The outdoor world had a notable significance in the lives of our participants The impact of dementia on outdoor life The familiarity of the environment</p>
<p>Gibson, Robertson and Pemble, 2017 UK *</p>	<p>To evaluate the impact of the 'Paths for All' dementia friendly organised walking groups on social health</p>	<p>Qualitative Walking interviews Focus groups</p>	<p>6 people with dementia (6 walking groups – 1 dementia specific/5 dementia friendly) 6 Carers (dementia inclusive groups) Age Not Specified</p>	<p>Dementia friendly Walking Groups</p>	<p>Being with others Being outdoors Atmosphere, ethos, and accessibility Safety and security Leadership and organisation</p>

Gibson, Ramsden, Tomlinson et al., 2017 UK *	To understand the role of outdoor activities in improving the wellbeing of people living with dementia	Qualitative Semi-structured interviews Observations	9 people with dementia 9 Carers (dementia specific group) Age not specified	Woodland Activity	Connection and communication Descriptions about the Experience of being in the woods New activities and learning Being out and about Support, inspiration, and containment from leaders
Gibson et al., 2007 UK	To determine if and how nature and natural environments were important to people with dementia and identify potential barriers	Qualitative Semi-Structured interviews Focus groups (carers and professionals)	16 people with dementia (9 female and 7 male) Carers Mild to severe Dementia Age not specified	Independent Outdoor activity	Not specified
Hendricks et al., 2016 Netherlands	To discover what aspects of nature people living with dementia consider important – leading to the	Qualitative Semi-structured interviews Focus groups	24 people with dementia (16 female and 8 male) Professionals	Personalised nature-based activity	Pleasure Relaxation Feeling fit Enjoying the beauty of nature

	development of personalised nature-based activities		(dementia specific) Purposive sampling applied – participants were required to have one or more ‘behaviour’ or ‘mood’ problem Age Not specified		Feeling free The social aspect of nature Feeling useful memories
Ibsen et al., 2019 Norway	To determine the characteristics associated with quality of life for people with dementia attending farm-based day care	Qualitative Semi-structured interviews Quality of life assessment: Qol-AD The Oslo Social support assessment: OSS-03	94 people with dementia (62 % were men) Carers Mid dementia (dementia specific)	Farm based day care	Not specified

			Age 58-96		
Mapes et al., 2016 UK *	To determine the role of outdoor activity and natural outdoor spaces in helping people with dementia to live well	Mixed methods Focus groups One to one interviews	54 people with dementia (50 via focus group and 4 via one-to-one interview) Early to more advanced stages of dementia Carers Age 50-late 80's	Mixed – experiences of independent and group activity	Activities with purpose Factors that help or hinder engagement with nature Support from others Preferred places to engage with nature
Mapes & Hide, 2011 UK *	To determine the benefits of green exercise for people with dementia	Mixed methods Walking interview Surveys Professionals Anecdotal	People with dementia and carers (not specified) Age not specified	Independent Outdoor activity	Sensory and emotional memory, need for nature, landscape Walking, activity, and free exercise Thriving, symptom reduction and recovery Positive risk talking, choice, friendship, and solidarity Safety, loss, and permission

McDuff & Phinney, 2015 Canada	To determine the subjective meaning of activity in the everyday lives of people with dementia	Qualitative Conversation style interviews Including families)	12 people with dementia (6 men and 6 women) Mind to moderate dementia Age 65-86	Independent Physical activity - walking	Attractions to activity Impediments to activity Making adjustments
Noone & Jenkins, 2018 UK	To explore the lived experience of people with dementia who participate in community-based gardening projects	Qualitative Phenomenological approach Semi-structured group interviews Observations	6 people with dementia (5 women and 1 man) (dementia specific) staff Age not specified	Community gardening project	Identity Agency Community
Odzakovic et al., 2018 Sweden	To explore the lived experience of community dwellers with	Qualitative Phenomenological approach	14 people with dementia	Independent Walking in the neighbourhood	Life narratives Selfhood and wellbeing through movement

	dementia and how they interact with their neighbourhoods (social aspect and physical activity)	Walking interviews	(11 men and 3 women) Age 62-87		Social context Restorative connections to nature
Olsson et al., 2013 Sweden	To understand the reflections of people with early-stage dementia in being outdoors	Qualitative Conversation style interviews	11 people with dementia (6 men and 5 women) Early-stage dementia Age 52-81	Independent and group outdoor activity	The outdoors as confirmation of self Still being part of it – a sense of grief and loss Striving to keep on despite perceived barriers
Sensory Trust, 2018 UK *	Through the 'Creative Spaces in the Community' project - improve the physical and mental health of older people with dementia in isolated and disadvantaged communities in Cornwall by using outdoors and nature based	Mixed methods Surveys Diaries Mobile phone activity trackers Group interviews Focus group interviews	5 groups of 12 to 20 members – people with dementia (numbers varied weekly) Carers/ relatives and friends Volunteers	Nature based group activities (3 walking groups/ 1 walking and pottery group and 1 nature and gardening group)	Physical health Mental health and wellbeing Independence Improved community support

	activities to become more active, build social networks and foster independence	Observations Walking interviews	Age 65 years plus		
Smith-Carrier et al., 2019 Canada	To explore the experiences of therapeutic gardening for people with dementia, and their perspectives on the senses and emotions elicited in the gardening process that promote wellbeing	Qualitative Phenomenological approach Semi-structured interviews	6 people with dementia Early stages of dementia (dementia specific) Age not specified	Therapeutic gardening Group	Activating the senses The significance of being occupied in meaningful work The peace and hope from being in the moment

Table 3 – Table of included Studies

*Refers to grey literature

Theme	Sub-theme	Representative Studies
<ul style="list-style-type: none"> The significance given to being outdoors and connecting with the natural world 	<ul style="list-style-type: none"> Nature connectedness 	Duggan et al., 2008; De Bruin et al., 2021; Gibson, Ramsden, Tomlinson et al., 2017; Hendricks et al., 2016; Ibsen et al., 2019; Mapes et al., 2016; Sensory Trust, 2018
	<ul style="list-style-type: none"> Multi-sensory experience 	Cook, 2020; Gibson et al., 2007; Gibson, Robertson and Pemble, 2017; Hendricks et al., 2016; Mapes et al., 2016; McDuff & Phinney, 2015; Odzakovic et al., 2018; Olsson et al., 2013; Smith Carrier, et al., 2019
	<ul style="list-style-type: none"> Opportunities to reminisce 	Cook, 2020; De Bruin et al., 2021; Hendricks et al., 2016; Smith Carrier et al., 2019
<ul style="list-style-type: none"> Connecting with others 		Cook, 2020; De Bruin et al., 2021; Duggan et al., 2008; Gibson, Robertson and Pemble, 2017; Gibson, Ramsden, Tomlinson et al., 2017; Hendricks et al., 2016; Mapes et al., 2016; McDuff & Phinney, 2015; Noone & Jenkins, 2018; Odzakovic et al., 2018; Olsson et al., 2013; Sensory Trust, 2018; Smith Carrier et al., 2019
<ul style="list-style-type: none"> Supporting self and identity 		Cook, 2020; De Bruin et al., 2021; Duggan et al., 2008; Gibson, Robertson and Pemble, 2017; Mapes & Hide, 2011; Noone & Jenkins, 2018; Odzakovic et al., 2018; Olsson et al., 2013; Smith Carrier et al., 2019
<ul style="list-style-type: none"> Freedom and independence 		Cook, 2020; Duggan et al., 2008; Mapes et al., 2016; Noone & Jenkins, 2018; Odzakovic et al., 2018; Olsson et al., 2013
<ul style="list-style-type: none"> Engaging in meaningful activity 		Cook, 2020; De Bruin et al., 2021; Duggan et al., 2008; Gibson et al., 2007; Gibson, Robertson and Pemble, 2017; Gibson, Ramsden, Tomlinson et al., 2017; Hendricks et al., 2016; Mapes et al., 2016; Mapes & Hide, 2011; McDuff & Phinney, 2015; Odzakovic et al., 2018; Olsson et al., 2013; Sensory Trust, 2018; Smith Carrier et al., 2019
<ul style="list-style-type: none"> Enhanced wellbeing and quality of life 		Cook, 2020; De Bruin et al., 2021; Duggan et al., 2008; Gibson, Robertson and Pemble, 2017; Ibsen et al., 2019; McDuff & Phinney,

		2015; Odzakovic et al., 2018; Sensory Trust, 2018; Smith Carrier et al., 2019
<ul style="list-style-type: none"> • The support of others 		Cook, 2020; Gibson et al., 2007; Gibson, Robertson and Pemble, 2017; Gibson, Ramsden, Tomlinson et al., 2017; Hendricks et al., 2016; Ibsen et al., 2019; Mapes et al., 2016; Mapes & Hide, 2011; McDuff & Phinney, 2015; Odzakovic et al., 2018; Olsson et al., 2013
<ul style="list-style-type: none"> • The impact of dementia 		Cook, 2020; Duggan et al., 2008; Gibson et al., 2007; Gibson, Robertson and Pemble, 2017; Mapes et al., 2016; Mapes & Hide, 2011; McDuff & Phinney, 2015; Odzakovic et al., 2018; Olsson et al., 2013

Table 4 - Overview of thematic analysis

Review of the literature

Eight themes and three sub-themes emerged. Each theme was represented in at least four studies, as presented in Table 4. It is important to note that the themes are interconnected and should therefore not be interpreted in isolation.

The significance given to being outdoors and connecting with the natural world

The importance of being outdoors in the fresh air was closely linked to positive feelings of wellbeing and quality of life (Duggan et al., 2008; Gibson et al., 2007; Gibson, Robertson and Pemble, 2017; Gibson, Ramsden, Tomlinson et al., 2017; Hendricks et al., 2016; Mapes et al., 2016; Olsson et al., 2013). The opportunity to feel and breath fresh air (Gibson et al., 2007; Olsson et al., 2013) was expressed as beneficial (Gibson, Ramsden, Tomlinson et al., 2017; Mapes et al., 2016). The natural environment enabled a wellness and feel-good factor (Gibson, Robertson and Pemble, 2017; Gibson, Ramsden, Tomlinson et al., 2017; Hendricks et al., 2016), that had a positive impact on depressive feelings (Ibsen et al., 2019; Sensory Trust, 2018; Smith Carrier et al., 2019).

Nature connectedness

Nature connectedness provided an emotional peace, a feeling of calm and comfort and of feeling grounded (Cook, 2020; De Bruin et al., 2021; Gibson, Ramsden, Tomlinson et al., 2017; Olsson et al., 2013; Sensory Trust, 2018). 'I love working in the dirt. I felt quiet and mindful and totally relaxed.....I have a connection with the soil and the first shoots...they represent hope' (Smith Carrier et al., 2019, p.10).

The ability to focus on the present and experience such positive emotions may support the notion of nature being innately therapeutic, spiritual, and restorative (Gibson, Ramsden, Tomlinson et al., 2017; Smith Carrier et al., 2019; Odzakovic et al., 2018).

Multi-sensory experience

Connecting with the natural world provided opportunities to enjoy the multi-sensory experiences of hearing the birds, seeing the landscape, trees, and flowers, and feeling the weather (Cook, 2020; Gibson et al., 2007; Gibson, Robertson and Pendle, 2017; Mapes et al., 2016; McDuff & Phinney, 2015; Odzakovic et al., 2018; Smith Carrier et al., 2019), this

extended to the tactile features of the natural environment (Gibson, Robertson and Pendle, 2017).

Being outdoors enabled a connection to the changing seasons, described as simple enjoyment (Cook, 2020; McDuff & Phinney, 2015), and the expression of hope and the chance to rejuvenate (Odzakovic et al., 2018; Olsson et al., 2013). One participant likened it to being like medicine, and another, 'It (being the outdoors) reminds me that there is still a lot of life left to be lived' (Olsson et al., 2013, p.796).

Opportunities to reminisce

The natural world provided opportunities for reminiscence, for recollecting and sharing memories (Cook, 2020; De Bruin et al., 2021; Hendricks et al., 2016), and the recall of memories in relation to being engaged in an activity i.e., gardening (Smith Carrier et al., 2019). The sensory association with reminiscence was specifically raised in relation to the sense of smell and poignantly expressed by one participant, 'smells take us out to the past. You remember something. After this comes that. Smells connect us. Close your eyes and pictures come' (Smith Carrier et al., 2019, p.7).

Supporting self and identity

The continuation or re-engagement with outdoor activities provided opportunities for supporting self (Cook, 2020; Gibson, Ramsden, Tomlinson et al., 2017; Mapes & Hide, 2011; Noone & Jenkins, 2018; Odzakovic et al., 2018; Olsson et al., 2013), and identity (De Bruin et al., 2021; Duggan et al., 2008; Gibson, Robertson and Pendle, 2017; Noone & Jenkins, 2018; Smith Carrier et al., 2019).

Opportunities to engage in activity enabled a confidence in the participants and their abilities, leading to expressions of empowerment and agency (Cook, 2020; Noone & Jenkins et al., 2018; Olsson et al., 2013). This also contributed towards feelings of self-worth (Cook, 2020; Mapes & Hide, 2011; Olsson et al., 2013), the maintenance of a positive self-image (Odzakovic et al., 2018), enabled people to express aspects of their identities (Gibson, Robertson and Pendle, 2017; Noone & Jenkins, 2018; Odzakovic et al., 2018), and share knowledge (De Bruin et al 2021; Gibson, Ramsden, Tomlinson et al., 2017; Noone & Jenkins, 2018; Sensory Trust, 2018).

Connecting with others

Participants considered social interaction to be a highly valued element of engaging in the natural world within a group setting (Cook, 2020; De Bruin et al., 2021; Gibson, Robertson and Pendle, 2017; Gibson, Ramsden, Tomlinson et al., 2017; Noone & Jenkins, 2018; Sensory Trust, 2018; Smith Carrier et al., 2019). Thus, a salient theme was connection, and the belonging and support participants experienced from being part of a group (Cook, 2020; Gibson, Robertson and Pendle, 2017; Gibson, Ramsden, Tomlinson et al., 2017; Noone & Jenkins, 2018; Sensory Trust, 2018; Smith Carrier et al., 2019), and its role in alleviating loneliness (Sensory Trust, 2018).

Interestingly, participants of studies which focused on independent outdoor activity reported actively seeking out social interaction with others (Duggan et al., 2008; Odzakovic et al., 2018; Olsson et al., 2013), as expressed by one participant, 'I usually find someone to talk to on route' (Duggan et al., 2008, p. 195).

Freedom and independence

Being outdoors in the natural world enabled a sense of freedom and independence (Cook, 2020; Duggan et al., 2008; Noone & Jenkins, 2018; Odzakovic et al., 2018; Olsson et al., 2013), with an increased sense of empowerment through freedom of independent choice in activities (Cook, 2020; Olsson et al., 2013). Being unable or restricted to go outdoors is likened to being a prisoner (Mapes et al., 2016), and is associated with feelings of depression (Duggan et al., 2008) and the loss of self-confidence and dignity (Olsson et al., 2013).

Engaging in meaningful activity

Activities that were considered to be meaningful included physical exercise, such as walking (Gibson, Robertson and Pendle, 2017; Mapes & Hide, 2011; McDuff & Phinney, 2015; Odzakovic et al., 2018; Olsson et al., 2013; Sensory Trust, 2018), activities that enabled a continuation or re-connection with pastimes and interests once enjoyed (Cook, 2020; Gibson et al., 2007; Olsson et al., 2013; Smith Carrier et al., 2019) and engaging in new outdoor activities (Cook, 2020; Gibson, Ramsden, Tomlinson et al., 2017).

Meaningful activity was further conveyed in terms of feeling useful (Gibson, Ramsden, Tomlinson et al., 2017; De Bruin et al., 2021; Hendricks et al., 2016) and purposeful (Mapes

et al., 2016; McDuff & Phinney, 2015). 'Yes, I want to make myself useful physically, I can still do a lot, my mind may not be quite there, but my body can still handle a lot' (De Bruin et al., 2021, p. 595).

Two studies, involving participants of various ages noted the value of meaningful activities, specifically in relation to participants with younger onset dementia (Cook, 2020; De Bruin et al., 2021), which provided them with a sense of contribution. However, other studies found that being involved in an outdoor activity that provided occupation, was productive, gave meaning and focus whilst enabling people to fulfil their potential, was important for all age ranges (Duggan et al., 2008; Gibson, Robertson and Pendle, 2017; McDuff & Jenkins, 2015; Smith Carrier et al., 2019).

Enhanced wellbeing and quality of life

Several studies indicated a strong link between being outdoors in nature and the associated opportunities for social interaction with enhanced wellbeing and quality of life (Duggan et al., 2008; Mapes & Hide, 2011; Odzakovic et al., 2018). Moreover, the act of physical activity outdoors was a catalyst for improved wellbeing (McDuff & Jenkins, 2015).

More recent studies highlight the collective impact of being in nature and engaged in meaningful outdoor activities with others as components which positively affected the health and wellbeing of people living with dementia (Cook, 2020; De Bruin et al., 2021; Smith Carrier et al., 2019).

Factors that enable or challenge access to the natural world

The support of others

Support from carers, family or friends was the central mechanism for enabling access to the natural world (Cook, 2020; Gibson et al., 2007; Gibson, Robertson and Pendle, 2017; Gibson, Ramsden, Tomlinson et al., 2017; Hendricks et al., 2016; Ibsen et al., 2019; McDuff & Phinney, 2015; Odzakovic et al., 2018). Being allowed (Olsson et al., 2013), or granted a sense of permission to engage in certain outdoor activities (Mapes & Hide, 2011) by carers, resulted in increased self-confidence and happiness amongst participants. Contrastingly, when restricted, reflections centred around a loss of self-confidence and dignity (Olsson et al., 2013).

Support and encouragement from other participants within group-based activities presented a notable theme where feelings of confidence, reassurance, and safety were highlighted (Gibson, Robertson and Pendle, 2017; Gibson, Ramsden, Tomlinson et al., 2017; Mapes et al., 2016).

Support on an organisational level centred around the helpfulness of staff and the impact this had (Cook, 2020; Gibson, Robertson and Pendle, 2017; Mapes et al., 2016), which in some cases led to feelings of safety (Gibson, Robertson and Pendle, 2017) and equality (Gibson, Ramsden, Tomlinson et al., 2017). The importance of dementia awareness training for staff and volunteers by service providers and organisations who manage outdoor green spaces was discussed mainly in relation to supporting people in a person-centred way (Cook, 2020; Gibson, Robertson and Pendle, 2017; Hendricks et al., 2016).

Physical accessibility played an important role in determining engagement with the natural world and associated activities (Cook, 2020; Gibson, Robertson and Pendle, 2017; Mapes et al., 2016; McDuff & Phinney, 2018). This highlights the need for organisations to recognise the positive impact that engaging with the natural world can have on people living with dementia, and their role in supporting this to take place (Cook, 2020; Gibson, Robertson and Pendle, 2017; Mapes et al., 2016).

The impact of dementia

Memory loss was highlighted as a reason for reduced outdoor activity (Duggan et al., 2008; Gibson et al., 2007; McDuff & Phinney, 2015).

The concerns around memory loss, disorientation and confusion were expressed primarily in relation to the fear of getting lost (Duggan et al., 2008; Gibson et al., 2007; Mapes et al., 2016; McDuff & Phinney, 2015; Olsson et al., 2013). Interestingly, in the majority of studies this was reflected on more by carers than participants. Interviews with participants in one study showed 20% considered their dementia to be a barrier to using outdoor spaces, compared to 83% of carers who were asked the same question, with anxiety and caution amongst carers identified as the main catalyst for concern (Mapes et al., 2016). In an earlier study the same author suggests that risk should be 'considered in the context of the potential benefits an individual may gain from any given activity out in nature' (Mapes & Hide, 2011, p. 15). Further studies concur (Cook, 2020; Olsson et al., 2013), and make reference to an acceptance

amongst participants of potential risks, for example, adverse weather and the risk of falls, in preference to being confined indoors (McDuff & Phinney, 2015; Olsson et al., 2013).

Feelings of reduced confidence and anxiety were highlighted in three studies (Duggan et al., 2008; Mapes et al., 2016; Olsson et al., 2013), although only one study noted how such reduced confidence and anxiety, together with memory loss, disorientation, and confusion, collectively impacted on the individuals use of outdoor spaces. This 'shrinking world' (Duggan et al., 2008), leads to reduced independent outdoor activity, resulting in more familiar and closer to home movement. However, contrastingly, Odzakovic et al. (2018) argues that such familiar areas presented subjective significance and social opportunities.

In order to maintain desired outdoor activities people living with dementia used adaptive strategies, adjusted their routines (Gibson, Robertson and Pendle, 2017; Mapes & Hide, 2011; McDuff & Phinney, 2015) or used problem solving strategies to overcome or manage potential problems in order to retain their outdoor activity (Olsson et al., 2013).

Walking, a valuable activity across the studies was also used as an alternative form of exercise and means of connecting with the natural world for participants who did not feel able to engage in the more demanding activities they once did (McDuff & Phinney, 2015; Olsson et al., 2013).

Discussion

The review demonstrates how valuable the natural world can be as an arena for enablement, providing opportunities to connect to self, place, and others. With support mechanisms in place, people can retain a sense of freedom and independence facilitating enhanced wellbeing and quality of life.

The combination of being outdoors, of feeling and breathing fresh air provided the catalyst in activating a feel-good factor, a sense of freedom and a positive effect on mood and depression, which is consistent with wider research amongst participants living both independently and within residential care (Bragg et al., 2011; Cedervall et al., 2015; Chester Evens et al., 2019; Newton et al., 2021; Whear et al., 2020).

A further key finding of this review considers nature connectedness, and the associated sense of comfort and peace experienced through feeling a part of nature. Comparable research, although predominantly carried out in residential care, reflects these findings (Cedervall et al., 2015; Han et al., 2016; Orr et al., 2016; Whear et al., 2014). In addition, more detailed and descriptive accounts relating to the restorative (Chalfont, 2006; Hsieh et al., 2018), spiritual (Orr et al., 2016) and therapeutic (Chalfont, 2006) meanings given to, and benefits derived from such connections, were discussed. Despite limited review findings, the evidence clearly substantiates the innate connection between human beings and the natural world, further validating the biophilia hypothesis as discussed in the introduction, and the numerous benefits afforded to the health and wellbeing of people living with dementia.

Interaction with the natural world enabled people living with dementia to experience multi-sensory stimulation through opportunities to physically experience the weather and the changing seasons. This is consistent with wider research (Clark et al., 2013; Chalfont, 2006), and further documented with older people living in residential care (van den Berg et al., 2020).

Sentiments of hope and of looking towards the future, appear limited within wider literature, aside that of 'hope' in the context of finding a cure for dementia (Peel, 2014). As hope is considered to be a motivating and protective personal strength associated with a sense of agency and determination that can support people to live well with dementia (Wolverson et al., 2016), further research in this context would be valuable.

The natural environment encourages memory stimulation by providing a link to the past (Chalfont, 2009; Newton et al., 2021; Orr et al., 2016; Whear et al., 2014) and memories of childhood which in turn, may stimulate conversation and engagement (Hall et al., 2018; Hsieh et al., 2018). Supporting studies acknowledge the connection between memory stimulation triggered by the natural world and the maintenance of one's sense of self and identity, recognised through being engaged in familiar outdoor activity (Hall et al., 2018), or familiar outdoor space (Whear et al., 2014).

This review considers the role of continued engagement with outdoor activities and the associated support to self and identity. For many participants such continuity appeared to be identity affirming, being most notably linked to interests participants had always had. Comparable research substantiates the review findings, in that being outdoors and engaged in activity with others further reinforces a sense of identity (Chalfont, 2009) agency (Chung et al., 2017), and self-esteem (Jarrott et al., 2002). When considering the rationale for this, Phinney et al. (2007) suggests that activity may provide a sense of continuity for people with dementia by allowing them to feel their lives are fundamentally unchanged.

The majority of the reviewed studies considered social interaction with others to be a primary element when connecting with the natural world. Whilst it is understood that social interaction is an important component of wellbeing (Wright, 2018), it is particularly significant for people living with dementia given the social stigma associated with cognitive decline, which often results in the loss of pre-existing social relationships (Noone et al., 2017). In the present review, and as described by Clark et al. (2013) and Han et al. (2016), access to the natural world is a powerful mechanism for enabling people living with dementia to remain socially connected to others.

In the context of activity-based groups, the review findings reported a sense of belonging to be a prominent feature. Wider literature suggests this sense of belonging is attributed to the social rewards gained from interacting with others in the same situation (Junge et al., 2020), through feeling equal (Martin et al., 2015), reassured (Phinney et al., 2007) and being able to normalise difficulties and share coping strategies (Han et al., 2016).

Having access to the natural environment clearly contributed to a sense of freedom and independence. Research relating to participants in residential care highlights the significance

given to being outdoors and feeling free (Chester Evens et al., 2019; Hsieh et al., 2018; Newton et al., 2021; Whear et al., 2014). Although, when considering the statistics of low-level access to outdoor space, it is essential to consider the consequences of such restrictions on the health and wellbeing of people living with dementia. The review findings suggest this to be a lack of control and autonomy resulting in feeling trapped and imprisoned, findings with which wider research concurs (Heggestad et al., 2013; Newton et al., 2021). Additionally, it is necessary to acknowledge the issue of human rights, which appear to be easily neglected for people living with dementia (World Health Organization, 2015). For this reason, further intervention around supporting the freedoms and independence of people living with dementia deserves urgent and sustained attention.

A further finding of the review considered the significance of engaging in meaningful activity outdoors, expressed not simply in terms of pleasure and enjoyment but in feeling useful and purposeful, sentiments strongly echoed in wider literature (Chalfont, 2009; Phinney et al., 2007). Specifically relating to people with younger onset dementia, two studies in the review findings acknowledged a motivation for meaningful occupation (Cook, 2020; De Bruin et al., 2021), in particular a sense of contribution. Hewitt et al. (2013) concurs, suggesting meaningful occupation provides the opportunity to renew a sense of purpose and independence. However, given the review findings overwhelmingly support this to be the case for all participants, it could be argued that the benefits derived from meaningful engagement in outdoor activities is considered a fundamental aspect for all people living with dementia, regardless of their age.

The collective components of access to nature, meaningful outdoor activity, social interaction, and support are acknowledged as key to positive wellbeing within the review findings. Wider literature purports enhanced wellbeing appears evident through simply being present in nature (Orr et al., 2016; Sturge et al., 2021). Schwarz & Rodiek, (2007) theorise that access to the outdoors may in itself have substantial positive benefits, contributing to improved levels of independence, sense of freedom and self-esteem.

Support was found to be the central mechanism for enabling access and engagement with the natural world. Indeed wider research considers the support of others to be a primary enabling factor, principally acknowledged in terms of the availability and willingness, of both formal carers in residential care (Chalfont, 2006; Orr et al., 2016; Rappe & Tope, 2007), and

informal carers and relatives for people living independently (Chung et al., 2017; Clark et al., 2013). However, risks associated with accessing residential care home gardens was highlighted as the main barrier for formal carers withholding support (Chester Evens et al., 2019; Orr et al., 2016; Whear et al., 2014). Within the reviewed studies, reasons for such action were not directly discussed, although the feelings expressed by participants when restricted to engage with the natural world, perhaps presents a revealing and poignant picture, with the detrimental impact to confidence, dignity and overall wellbeing echoed in wider literature (Chung et al., 2017).

Support on an organisational level presented as an important review finding, acknowledged on many levels from the helpfulness of staff to basic issues of accessibility. However, further reports claim that knowledge surrounding the inherently positive benefits of access and engagement with the natural world for people living with dementia within both the health and social care sector and green-space organisations is underdeveloped (Clark et al., 2013; Local Government Association, 2012). This has led to claims that 'activity to encourage access and participate among people living with dementia is confined to the margins rather than being a key part of mainstream provision' (Clark et al., 2013, p. 11). According to Morgan and Williamson (2014) this could be explained through a risk-averse culture, concerns around organisational reputation and fear of media repercussions. Additionally, comparable research relating to people living with dementia in residential care shows a culture of organisational risk aversion (Chester Evan et al., 2019; Orr et al., 2016; Whear et al., 2014) and insufficient maintenance and adequate accessibility of garden areas (Orr et al., 2016; Whear et al., 2014).

The impact of dementia presented a number of significant issues, among which the fear of getting lost was a principle cause of reduced outdoor activity. This fear was mainly communicated by carers, and statistics presented within the review show a relatively low percentage of participants believing their dementia to be a barrier to them using outdoor spaces (Mapes et al., 2016). When considering the shrinking world theory as proposed by Duggan et al. (2008), analysis of the literature suggests familiarity of place as a positive dimension, interpreted as a means to continued engagement (Han et al., 2016; Phinney et al., 2007), and self-identity (Han et al., 2016). In addition, the use of adaptive strategies, as discussed in the review findings, enabled people living with dementia to maintain continuity with activities they found meaningful and sustain their independence. Furthermore, such

positive adaptation may give further backing to the notion of resilience amongst people living with dementia (Harris & Keady, 2008), and proactively adapting to their changing situations, which it could be argued actively challenges the notion of a shrinking world.

Risk aversion amongst carers, as discussed in the review findings, presented as a significant issue. Chalfont (2006) argues that nature is itself living and unpredictable, and, as such, carries with it an element of risk. Taking a more positive approach to risk, however, enables people to make their own choices, build upon their individual strengths and focus on their abilities (Morgan & Williamson, 2014).

Limitations of the literature

The majority of reviewed studies did not state at what stage in the dementia trajectory the participants were at, a theme replicated across wider supporting literature, which may impede proper analysis and therefore fail to reflect, in full, the benefits and potential challenges to connecting with the natural world.

When considering the generalisability of the review, it is important to note the considerable difference in timeframes of research amongst the studies, the variation on sample size of participants within the group-based activity interventions, the combination of group and independent engagement and the different geographic locations of the research.

Limitations of the review

It is important to acknowledge the challenges associated with the synthesis of qualitative literature across studies, and the potential loss to meaning given to experiences by participants through the process of data extraction and re-interpretation. Furthermore, it is essential to recognise the assumptions, beliefs and prior experience of the researcher and the influence this may have on the review.

Four of the reviewed studies reported a higher take up from male participants in group-based activities. Although not addressed within the review, an understanding of how gender may shape the opportunities of individuals living with dementia clearly warrants further inquiry.

Recommendations

There remains a paucity of research that seeks to understand how meaningful connections with the natural world can benefit people living independently with dementia. Further work

is required to understand the short and long-term benefits of such connections throughout the dementia trajectory. Furthermore, although forming an intrinsic element of this review inclusion criteria, the subjective voice of people living with dementia remains too often excluded from qualitative research (Taylor et al., 2012). The voices of people living with dementia are therefore essential if we are to fully understand the subjective experience of living with dementia.

Physical accessibility determines engagement with the natural world and associated activities, therefore organisations designing and managing outdoor spaces should provide suitable walkways, accessible signage, parking, and facilities. In addition, dementia awareness training for staff and volunteers within outdoor activity and green space organisations would provide valuable insight into the many challenges people living with dementia may face, promote consideration for their needs, help dispel misconceptions and encourage a more dementia friendly ethos (Bould, 2017). Further, the development of local dementia-friendly nature-based guides may promote increased use of natural environments by people living with dementia and encourage more group-based activities to take place.

A significant finding within the review centred around caution and risk aversion amongst carers. It is therefore proposed that organisations responsible for providing support to both people living with dementia and carers, assume a role in educating and encouraging carers and family members in supporting more independence and positive risk taking, together with the sharing of good practice. Likewise, General Practitioners and health professionals, who have an important role in supporting people living with dementia and their carers throughout the dementia trajectory (Alzheimer's Society, 2020), should be encouraged to further promote the relatively new concept of social prescribing, that being non-clinical support and activity within the local community (Frostick & Bertotti, 2019).

Conclusion

Analysis of the literature indicates that feeling connected is a significant motivation for engagement in meaningful activity, and may promote a sense of belonging, self, and social identity, improved emotional health, independence, and quality of life in people living with dementia (Han et al., 2016).

While progress has been made in terms of our understanding concerning the importance of connections with the natural world, and although there is now a growing movement of care providers and researchers who acknowledge the importance of natural solutions to improve the care and wellbeing of people living independently with dementia, insufficient opportunities and support remain (Clark et al., 2013; Noone et al., 2017). In light of this and the continued impact the Covid-19 pandemic is likely to present, perhaps it is timely to consider our natural outdoor resources. This will enable people living with dementia a means of connection, freedom and continuity, the ability to alleviate depression and reduce social isolation and enhance wellbeing and quality of life, undeniably offering far more than just a breath of fresh air.

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